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EDITORIAL

Dr. W. E. Gallie Retires as Dean

At Convocation, February 22, 1946, President Sydney Smith announced the retirement of Dr. W. E. Gallie as Dean of the Faculty of Medicine. At the end of June Dr. Gallie will conclude a ten year period as Dean and will be succeeded by Brigadier J. A. McFarlane.

Dr. Gallie was born in Barrie, Ontario. He studied medicine at the University of Toronto where as a student he was in contact with such men as Dr. Primrose in Anatomy, Dr. George Peters and Dr. C. L. Starr in Surgery. After graduating in 1903 he spent 2 years at the Sick Children's Hospital. Following this he received an appointment as House Surgeon at the Hospital for the Ruptured and Crippled in New York City. On his return to Toronto he became attached to the Toronto General Hospital as assistant to the late Dr. C. L. Starr. When Dr. Starr became Surgeon-inChief of the Hospital for Sick Children, Dr. Gallie was his assistant there.

During the years 1915-1917 Dr. Gallie was Chief of Surgery at the Davisville Military Hospital and here he came into prominence by reason of his success in

bone grafting operations. He served overseas from 1917-1919 in The Granville Canadian Hospital and while in England he succeeded in getting his Primary Fellowship.

On his return to Toronto he coached the Varsity Hockey Team and later became President of the University of Toronto Hockey Club.

In 1921 he succeeded Dr. C. L. Starr as Head of the Department of Surgery of the Hospital for Sick Children. In 1922 he was appointed to the Advisory Board of Orthopædic Surgeons for the Shriners' Hospitals for Crippled Children.

In 1923 Dr. Gallie was appointed Hunterian Professor of Surgery and was asked to deliver that year's lecture to the Royal College of Surgeons of England, one of the highest honours any surgeon could win and one which was usually reserved for an Englishman. He chose as his subject "The Use of Living Sutures Fascia in the Repair of Difficult Hernias and other Anatomical Defects." Dr. Gallie is famous for original work in this aspect of surgery and the procedure is now commonly known as the "Gallie Operation."

In May 1929 he was appointed Professor of Surgery at the University of Toronto and Surgeon-in-Chief of the Toronto General Hospital, succeeding Dr C. L. Starr.

In 1930 The Charles Meikle Fellowship was awarded to him. This fellowship is awarded annually to the member of the medical profession considered by the faculty of medicine to have done most during the preceeding ten years to advance practical knowledge in Medical Art or Science. In this year Dr. Gallie succeeded Professor Fitzgerald as Dean of the Faculty of Medicine.

In June 1936 Dr. Gallie addressed the Massachusetts Medical Society in Boston. Here is discussed "Dislocations and Technique of Replacing Old Ligaments with New Ones." His manuscript was taken by the American Medical Journal for publication and circulation throughout the world.

In 1940 Dr. Gallie was elected President of the American College of Surgeons. This College is composed of representatives from both the United States and Canada and this election is the highest honour available on this continent.

Dr. Gallie is a Fellow of the Royal College of Surgeons of England, Fellow of the Royal College of Surgeons of Canada, Fellow of the American College of Surgeons, Member of the American Surgical Society, Member of the American Orthopædic Society and Member of the Canadian Medical Association.

Dr. Gallie will continue as Surgeon-in-Chief at the Toronto General Hospital and as Professor of Surgery and head of the Department in the Faculty of Medicine.

INJURIES TO THE CHEST WALL AND INTRATHORACIC STRUCTURES

By ROBERT M. JANES

Injuries to the thoracic cage and its contents are, apart from those relatively simple fractures of ribs and cartilages, not common in civilian practice. Whether serious disability will result from the minor injuries or death follow the major lesions will depend upon the attending doctor possessing a reasonable knowledge of the principles involved in their diagnosis and management. This paper presents what should be known by the average practitioner. A discussion of the major surgical procedures necessary in a comparatively few cases has been avoided.

1. *Injuries to Ribs and Cartilages*

Simple fractures of ribs result from direct injury in the form of a blow or a fall against a projecting object. They are recognized by the presence of a point or points of tenderness on the rib or ribs involved and by pain at the site of injury upon manual compression of the chest. Surgical emphysema about the area indicates a puncture of the parietal pleura and an associated pneumothorax. X-rays of the chest will usually demonstrate the fracture but if it is in the curve of the rib on the lateral aspect of the chest and there is no displacement the ordinary P.A. film may fail to show it. Under such circumstances a negative report must not be accepted without repeating the exposure from a suitable direction. Uncomplicated fractures of ribs are best treated by strapping that side of the chest in full expiration with adhesive tape or elestoplast. To be effectual the strapping must extend beyond the midline in front and behind. Sufficient immobilization may be produced by wearing a tight support, in men by a pleat in the back of the vest, in women by a firm binder It is often impossible to apply an efficient and at the same time comfortable strapping to the chest of an obese woman in which case an improvised support may give more comfort. Most of the discomfort will, as a rule, be over in two to three weeks after which the support may be discontinued. Soreness remains for about six weeks. Non-union is very uncommon.

Injuries to cartilages are more difficult to be certain of when no recognizable displacement has occurred. The presence of a point of tenderness over a cartilage with pain on effort and on coughing or sneezing may be accepted as evidence of such an injury. Along the lower chest margin there may be, in addition to these signs, an undue prominence and mobility of the tip of one of the cartilages as compared with the other side. Occasionally a very severe blow fractures one or more cartilages near the sternum and displaces the broken end beneath it. It is difficult to replace such a cartilage or if successful in this, to maintain it in its proper position. Recovery is probably more rapid and certain if a small segment of cartilage is excised through an open exposure. The simple injuries are best treated by strapping and require up to six weeks for recovery. Occasionally when the tip of a cartilage has been loosened from its moorings along the lower chest wall, pain on

exertion or pressure remains and excision of a section becomes necessary. Lesions of cartilage are, of course, not visualized in the x-ray unless extensive calcification has occurred.

2. *Injuries to the Sternum*

Fractures of the sternum are quite uncommon but do occur in severe injuries as when the driver of a motor car is thrown forward against the steering wheel. They are recognized by a point of tenderness, occasionally by a palpable displacement, and by pain in the area on exertion, coughing or sneezing. An ordinary P. A. film often fails to demonstrate the fracture but a good lateral plate usually shows it or if this fails, a laminograph. Fractures without gross displacement may be treated by wide strapping of the front of the chest with a pad over the site of injury. If there is gross displacement an open reduction will result in more rapid recovery. Occasionally in the osteoarthritic individual an injury results in persistent pain in the joint between the manubrium and body of the sternum and fusion becomes necessary for relief.

Pulmonary complications following injuries to the chest wall come most often from the failure to clear branchial secretions and the development as a direct result of this of bronchial obstruction, atelectasis and broncho-pneumonia. If the patient's condition will permit it he is safer out of bed. Otherwise if there is difficulty in raising sputum he should be nursed on an inclined plane with the head low, sufficient sedation being given to permit coughing and frequent change of position without too much pain. The temporary relief obtained by blocking several intercostal nerves with novocaine may be very helpful. When the danger of pneumonia becomes apparent sulphonamides or penicillin should be given as a prophylactic measure Petechial haemorrhages into the underlying lung with congestion probably occur at times and predispose to pulmonary infection. Lung abscess occasionally follows a direct injury to the chest wall.

3. *Traumatic Pneumothorax*

Pneumothorax may follow chest trauma as a result of rupture of a subpleural bulla, from a tear of the lung by an adhesion or in more severe injuries from gross laceration of lung tissue. It may also result from laceration of the underlying lung by a fractured rib, penetrating wounds of the chest wall and from bullet wounds. It may or may not be complicated by a haemothorax. The symptoms are pain and shortness of breath: even in the absence of gross bleeding there may be considerable shock. Diagnosis is based on clinical findings and x-ray. The real danger from pneumothorax results from the development of a positive pressure. Unless relieved promptly by the institution of water-seal drain this may rapidly prove fatal. Uncomplicated traumatic pneumothorax recovers spontaneously as a rule, in from six weeks to two months.

4. *Haemothorax*

Haemothorax may result from an injury to an intercostal vessel by a fractured rib, a puncture or a penetrating wound, and from laceration or tearing of the lung

Bleeding from an intercostal vessel is most likely to prove serious because of the high pressure in the systemic circulation. Bleeding from the lung, on the other hand, is likely to cease spontaneously unless a large vessel at the lung root be torn, because of the low pressure in the pulmonary circulation. In only rare instances does haemothorax call for the employment of major surgical measures. In most cases bleeding stops spontaneously. Treatment consists of bed rest, adequate sedation and repeated aspiration of blood from the pleural cavity. Most patients prefer to be nursed in the Fowler's position but if there is much difficulty in raising secretions the head should be lowered. There is some difference of opinion as to whether twenty-four hours should be allowed to elapse before the first aspiration. There seems to be no objection to aspiration within this time and indeed it is often necessary for confirmation of the diagnosis or the relief of intrapleural pressure. Daily aspirations should be done and all obtainable blood removed. The instillation of 20,000 to 50,000 units of penicillin following each aspiration lessens the chance of infection. The experiences of World War II have demonstrated beyond question that empyema occurs much more frequently without than with aspiration. If the blood is left in situ much fibrosis is likely to occur with limitation of movement of the lung, chest wall and diaphragm. Early institution of breathing exercises hastens convalescence.

Except in those rare instances in which bleeding proves rapidly fatal no patient should be permitted to die of haemorrhage without the benefit of surgery. Where there is evidence that the blood may be from an intercostal vessel the local area should be explored. If this is not the source a thoracotomy should be proceeded with. Such operations are likely to be worth while only when the services of a surgeon familiar with the problems of thoracic surgery as well as facilities for closed anaesthesia and copious transfusions of blood are available.

5. *Crushing Injuries of the Chest*

The classic picture of traumatic asphyxia with suffusion of the face, neck, upper thorax and arms is described and pictured in most text-books of surgery. An x-ray of the chest should be obtained as early as possible to exclude other injuries. Treatment consists of rest in bed in the Fowler's position, sedation and administration of oxygen. The use of an oxygen tent is preferable but if this is not available intranasal catheters or an oxygen mask may be used. The tendency is to spontaneous recovery.

Severe crushes or blows on the chest wall may cause fractures of several ribs in two or more places—the so-called stove-in chest. Such an injury produces a segment of chest wall which moves in with inspiration and out with expiration, the so-called paradoxical breathing, which is likely to result in serious interference with ventilation. Firm strapping of the chest wall, if indicated over a pad, restores its rigidity and therefore the efficiency of respiration. Oxygen may be given if necessary. Intercostal nerve block is valuable.

Mediastinal emphysema may follow crushes of the chest through the rupture of multiple aveoli, the air seeping into the mediastinum along the bronchial structures,

or from tearing of the trachea or bronchi. If the mediastinal pleura is torn at the same time a pneumothorax will also occur. When only minor amounts of air escape from alveolar ruptures and the escaped air is confined to the mediastinum its presence may be recognized by peculiar crackling sounds heard with the stethoscope. When larger amounts escape the air travels up along the great vessels and appears in the suprasternal area. From there it may spread over the whole surface of the body from the attachments of the scalp to the soles of the feet. The fact that air appears first in the suprasternal area makes its origin in the mediastinum apparent. Extensive emphysema is unlikely to result from alveolar rupture so that rapidly spread subcutaneous air usually indicates a tear of trachea or bronchus. In such a case, providing the condition of the patient warrants it, the chest should be explored and the opening in the bronchus closed. In the absence of pneumothorax the chief danger in the past seems to have arisen from infection in the mediastinum. Administration of penicillin is likely to lessen the danger in future cases. Should supurative mediastinitis occur surgical drainage must be considered.

Compression of the lower chest wall and upper abdomen may produce a rupture of the diaphragm. Such ruptures nearly always occur in the left diaphragm, a similar injury on the right side being more apt to produce a fracture of the liver. The signs are those of tympany and perhaps borborygmi instead of breath sounds over the lower left chest, an absent or displaced apex beat and displacement of the heart to the right side. Since the spleen can be ruptured at the same time there may be evidence of internal haemorrhage. The diagnosis may be confirmed by x-ray. Evidence of internal haemorrhage or signs of intestinal obstruction demand immediate operation. An increasing distension of the stomach as a result of interference with the escape of air from it also calls for early operation unless the distension can be relieved by passing a tube. In the absence of these complications operation may be deferred until the patient has recovered from the immediate effects of the trauma.

6. *Wounds of the Chest*

Non-penetrating wounds of the chest wall call for the same treatment as similar wounds in other parts of the body. If seen in the first few hours a careful wound toilet should be carried out and the tissues closed in layers. In the care of contaminated wounds of more than 6 hours duration partial approximation of the deeper tissues with packing of the superficial part is safer than primary closure. Delayed primary closure may be carried out a few days later.

Penetrating wounds of the chest wall with sharp instruments such as knives or high power bullets do not necessarily call for any special treatment apart from careful cleaning of the wound. Account should be taken of their location and direction. For example those over the lower chest may have involved the diaphragm and produced serious intra-abdominal injuries. If there is a wound of exit the course of the bullet can be calculated readily. If, as is more likely, the bullet remains in the body, x-ray demonstration of its position will enable one to calculate its course and the anatomical structures likely to have been involved. The probable involvement of hollow viscera demands a laparotomy at the earliest moment at which

circumstances and the patient's condition warrant it. In the case of wounds in or near the pericardium the possibility of an injury to the heart should be considered. If a wound in the heart does not result in immediate or almost immediate death danger next arises from continued bleeding into the pericardium with the production of so-called cardiac tamponade. The signs of this condition are in brief, increase in the area of cardiac dullness, weak or almost absent apex beat, muffled and finally absent heart sounds and a falling pulse pressure. Venous pressure rises steadily while arterial pressure falls. Temporary relief may be obtained by aspiration of blood from the pericardium but the only hope of recovery, if bleeding continues, lies in surgical closure of the opening in the heart.

Whether or not retained foreign bodies require removal depends upon a variety of considerations that need not be discussed. With few exceptions removal of them can be undertaken at an operation of election.

Sucking wounds of the chest wall result from large lacerations and apart from the injuries of war are fortunately rare. They interfere so seriously with the mechanics of respiration that such patients, unless properly treated, are unlikely to survive for long. Bleeding from the chest wall should if possible be controlled by ligation of large vessels. The opening should then be closed by strapping a large vaseline pad over it. If proper materials are not obtainable whatever is at hand should be used to occlude the opening and control bleeding while the patient is being transferred to hospital.

"COURAGE AND DEVOTION BEYOND THE CALL OF DUTY"

Through the cooperation of Mead Johnson & Company, $34,000 in War Bonds are being offered to physician-artists (both in civilian and in military service) for art works best illustrating the above title.

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CANCER OF THE CERVIX

C. A. F. MOES

Carcinoma of the cervix uteri is probably the most important of all diseases with which the gynecologist has to deal, because of its frequency and its extreme gravity to the individual patient. It is the most malignant disease of the female body and comprises about 45% of all cases of cancer in the female and 75% of all cases cases of cancer in the female genitalia.

Etiology: Cervical cancer is most frequent in the years immediately preceding and including the menopause and is relatively constant until the age of sixty. However there is an occasional case reported of this disease in young patients; but it is rare before the age of thirty and infrequent before forty.

It has been noted that 96% of cases are in parous patients and furthermore it is more common in poorer classes than in the wealthy. This suggests that trauma to the cervix at childbirth, notably lacerations with eversion of the cervix and erosions of the cervix, are important factors in the etiology.

There is, however, another aspect of this matter. It may be that pregnancy itself and not the trauma of childbirth is the cause of the cancer. In a certain number of cases pregnancy is accompanied by proliferation of the cervical epithelium. This change which must be due to endocrine stimilation, may continue as long as eighteen months after pregnancy, and may well act as a precancerous lesion. The female sex hormones it must be remembered are similar to the carcinogenic hydrocarbons in their common derivation from sterols and in œstrogenic properties and there is marked excretion of prolan in over 80% of cervical cancer.

It has been suggested by some that carcinoma of the cervix may be associated with leukoplakia of this structure; but there is no conclusive evidence that this is a common condition nor that it is a precursor of cancer of the cervix.

Cancer of the cervical stump has received much consideration. It is now thought that there is no increased incidence, but that the disease is present before the supravaginal hysterectomy and is not recognized at the time of operation. Yet it should be noted that there is more than a normal incidence of pocketing of the cervical canal, unsatisfactory drainage, cystic changes, and chronic inflammation in the cervical stump and this presents somewhat more of a hazard than the normal cervix.

Textbooks state that 96% of cancer of the cervix occurs in parous patients, but it must be remembered that 85% of women are parous, so this point might not be as important as it is thought to be.

Pathology: The sites of origin of cervical cancer are the portio vaginalis and the endocervix. At either site the growth may be fungating or infiltrating and may arise from the surface epithelium or the glands. The great majority of cancer is squamous-celled; only 6% are adeno-carcinomatous.

The early gross appearance of cancer of the cervix may present any of the following characteristics:-

(1) An injected granular patch, which simulates a so-called "erosion"; or a polyp.
(2) A zone of increased density or a small nodule.
(3) An ulcer.
(4) An injected atresic or sclerotic condition.
(5) Changes in a leukoplakic plaque.

Advanced stages develop from the above and show four forms:

(1) Fungating type—there is a papillary growth which may spread over the cervix and vault of the vagina or even to the vaginal outlet. The vaginal canal may be narrowed or occluded by this. However there is little tendency to invasion of the deeper tissues and spread beyond the vaginal fornices but eventually extension into the parametria and deeper tissues occurs.
(2) Infiltrating type—there is a dense lobulated growth or there may be a hard infiltrating tumor developing in the submucous and deeper tissues. The cervix becomes bulky and hard, but even in advanced stages may retain its normal shape. In time the deeper tissues are invaded and the parametria and muscular coats of the corpus are involved. Finally necrosis starts near the os or in the canal and gradually ulceration occurs which may involve the whole uterine cavity.
(3) Ulcerative type—the margins of the growth become dense and thickened, and spread into adjacent tissues while the central necrosis forms an ulcer which replaces the cervix.
(4) Sclerosing type—there is extension into the parametria and adjacent tissues, which become thin, shrunken, inelastic and friable. As a result the cervix becomes flush with the vault or is replaced by a crater into which a funnel-shaped vaginal vault extends. The surface of the growth is reddened and glazed, with greyish necrotic patches.

The microscopic picture shows that in most cases the tumor originates where the stratified squamous epithelium covering the portio vaginalis meets the columnar epithelium lining the cervical canal at the external os. It is at this point that cervical erosion occurs with a change of squamous to columnar epithelium and reversal again to a squamous type with gradual development of an epidermoid carcinoma. It must be remembered that epidermoid carcinoma aside from arising in squamous epithelium in the portio vaginalis may arise from these cells which have extended into the cervical canal and also from the racimose glands of the portio which may be a starting place for an adenocarcinoma.

Epidermoid carcinoma has been divided into three groups on a radiosensitivity basis. Group 1, the adult type, is composed of highly differentiated cells with a tendency to cornification and pearl formation. This is radio-resistant. Group 2, in which the cells have lost their squamous characteristics and show a plexiform arrangement, a tendency to infiltration, and a degree of anaplasia. It is more radio-sensitive. Group 3 is anaplastic with undifferentiated cells and diffusely invasive. It is radio-sensitive.

Spread: Spread may occur by permeation, by lymph vessels, or by blood stream. Permeation may carry tumor cells to the parametrium, bladder, rectum and vagina. It is seldom that spread to the body of the uterus occurs. Lymphatic spread to iliac, hypogastric and sacral lymph nodes occurs. Blood spread is uncommon and is only found in advanced cases.

Clinical Symptoms: The chief initial symptoms of cervical cancer are haemorrhage, discharge and pain.

Haemorrhage is the first sign in about two-thirds of the cases. In the menstrual period it may be evident as an increased flow during periods, and during the premenopausal age this increased flow and a gradual lengthening and irregularity of menstruation may not be regarded as anything abnormal. More significance is usually attached to intermenstrual bleeding of a spotty character caused by unusual extertion or after coitus.

The discharge is most characteristically watery and colorless in the beginning if present at all. Later it may be purulent or tinged with blood and becomes very irritating and offensive. As the cancer develops both haemorrhage and discharge are found. In some cases the discharge occurs before any haemorrhage is noted.

Pain is a rare early symptom, but occasionally is the first symptom in cases of dense nodular infiltrating growth where there is no surface loss. Pain may also be caused by pyometra. Usually when pain occurs it means that the disease has passed beyond the cervical tissue.

In late stages these three may all be present and cachexia will be present also.

Diagnosis: Tends to be difficult as the disease is silent at first; endocervical cancer being more silent than the type which grows out of the cervix. Secondly it comes on usually near the menopause, and at this time many women believe irregular bleeding is normal and so do not think of cancer.

Firstly digital examination is carried out. This often reveals friable tissue which bleeds freely upon manipulation with the examining finger. It is best to insert only the index finger into the vagina. If the cervix cannot be felt then the middle finger may be inserted into the rectum thus lengthening the reach of the index finger. This gives additional information as to the relative freedom or fixation of the uterus and evidence of distant invasion if malignancy is present. Palpation may also reveal a fungating growth or even an early ulceration.

Secondly inspection with a bi-valve should be carried out. If the cervix appears normal it is safe to assume that the bleeding is from the cervical or uterine canal. In this case a diagnostic curettage is indicated for the presence or absence of intra-uterine or intra-cervical bleeding.

Other diagnostic measures are:-

The Schiller test—This consists of painting the cervix with an application of Gram's iodide solution. Normal vaginal mucosa and the vaginal part of the cervix is rich in glycogen and thus stains darkly. Any malignant area contains no glycogen and does not stain. Unfortunately leukoplakia and traumatic lesions of the cervical mucosa also remain unstained.

Vaginal Smear—This is possible as cancer of the cervix, with the partial exception of adenocarcinoma, is an exfoliative growth and hence sheds superficially placed cells. These float into cervical and vaginal secretions and mix with normal cells.

To make the smear a pipette is introduced into the vagina as far as possible and the secretions along the floor are drawn up. These are then spread on a clean dry slide and fixed in a solution of 95% alcohol and ether. A second smear is taken from the external os as the concentration of cancer cells is greater here. This smear is taken with the aid of a bi-valve speculum and a pipette is used to collect the secretion. The smear is fixed as before. The morphology and staining characteristics of these smears are studied. A positive smear is significant, but negative smears are of little significance.

Biopsy—The curette, scalpel, or a punch-forcep is used in obtaining material. A sufficient number of sections must be taken so that a small cancer area will not be overlooked. Incidentally it may be mentioned that the danger of disseminating cancer cells by gentle diagnostic excision has probably been overstressed. Manipulation and squeezing of the growth are much more likely to produce metatases.

Treatment—There has been an increase in the occurrence of cervical cancer. This is due to two things: (1) the average life expectancy is longer, and (2) it is diagnosed more accurately now. However the life expectancy of cancer patients has improved due to progress in diagnostic technique, surgical skill and advances in radiation therapy. Better obstetrical prenatal care, better social conditions and immediate and efficient repair of lacerations incurred during labor perhaps acts as a prophylaxis against the development of cancer.

Once a diagnosis of cancer is made, there should be no delay in instituting the proper treatment. A classification helps to decide whether to proceed with surgery or radiation therapy. Stage I is a minimal lesion. Stage II—the carcinoma infiltrates the parametria on one or both sides, but has not invaded the pelvic wall. Stage III—There is invasion of the pelvic wall on one or both sides and the carcinoma involves the lower third of the vagina. Stage IV—there is massive extension with involvement of the whole of the cervix and body of the uterus.

Surgical Treatment—This should be limited to those patients who are thin, young, in good health and whose growth has not advanced beyond Stage II.

The choice of procedure lies between radical vaginal hysterectomy and radical abdominal hysterectomy, which is the operation of choice in most clinics.

An example of this latter is a modification of the Wertheim operation. This operation is very radical and includes dissection of the ureters and removal of the pelvic cellular tissues and lymphatics. Doctor Wertheim reports a 60% five year cure following his operation.

Meigs believes that radiation is not the ideal method for treatment because of many radiation reactions he has seen and he believes that the morbidity caused by this treatment is great. He states it is not uncommon to find that in early cases patients failed to respond to radiation treatment when it was obvious that if the patient had been operated on success might have followed.

Results—Of forty-seven selected cases, presented by Dr. Meigs, in which patients were treated by operation, none died.

Bonney reports a five year survival rate of 40 per cent out of 366 patients treated by radical abdominal operation, equivalent to a 25% absolute survival rate. Bonney also believes that radiation of the inoperable cases adds 3 to 5% to the five-year cures.

Complications—Most significant are difficulties with the urinary tract. Cystitis, dilated ureters and hydronephroses occur very frequently from operation. This clears up in the majority. In 10% of cases, urethral fistulæ developed all cases of which must be treated by nephrectomy. Dr. Meigs believes that this treatment will give better results than radiation, however there is an overwhelming tendency towards radiation therapy.

Radiation Therapy—Radiation treatment of cervical cancer consists of (1) intracavitary application of radium into the cervical canal and vagina, and (2) external radiation by means of X-ray or telecurietherapy. These two procedures constitute integral parts of the procedure. Combined as a rule, one or the other method may be used exclusively. The external radiation may either precede, follow or be interpolated between two local applications.

There are certain precautions to be taken in radio-therapy. They are as follows:-

(1) Pyrexia—In many cases this is a toxic or septic reaction. Even a slight fever at the time of treatment bars the use of intracavitary radium. External radiation may be tried tentatively.

(2) Blood Condition:- Any anæmia preexisting should be treated before therapy is started. Similarly during treatment the red count should be watched for impending anæmia. About 5% of patients show a white blood cell sensitivity to radiation resulting in an unusual diminuation of the leucocytes, sometimes necessitating an interruption of treatment.

(3) Abnormal findings in the urine, with the exception of those due to the extension of the growth, must be cleared up before radiation.

Radiation effects on malignant cells are direct and indirect. These are (1) the sensitivity of individual cells to radiation and (2) the effect of impaired blood supply, resulting from radiation, on the cancer cells.

At the Toronto General Hospital the procedure is as follows once a diagnosis has been made:-

(1) A cervical culture for aerobic and anaerobic streptococci is taken. If positive the cervix is treated with sulpha or penicillin pastilles.

(2) A cystoscopic examination is made if the cancer is more than Stage II to see if there is bladder involvement.

(3) Ureters are catheterized. If they are not dilatable this suggests parametrial involvement.

(4) A biopsy is taken if this has not been already done. Therapy now depends on the stage of the disease and the type of patient.

In stage I—if the patient is a large woman radium alone is used. In more advanced cases, external radiation is used alone. This is to treat any secondary cancer in the area.

External radiation is carried out as follows:- two ports of radiation are placed anteriorly and 3 posteriorly. They are so placed as to miss radiating the bladder. In fat women two lateral ports are added, but there is danger to the head and neck of the femur with these. Each part is treated in rotation with 400 kv and 300 r units on succeeding days. Six to eight cycles of this is carried out.

The patient now has three to four weeks rest. If the cervical smear was positive another one is taken.

Intracavitary radiation is now carried out. Two platinum containers holding 20 mg. of radium each are put in rubber applicators separated by wood. These are then placed so that the longtitudinal axis of the applicators lie against the vaginal portion of the cervix. 4,200 mg. hours of radium is applied to this aspect of the cervix.

An intrauterine application may be given before, during or following the vaginal. Two, 30 mg. tandems are used for 4,200 mg. hours. If the cervical canal is occluded by growth and the tandems cannot be inserted then external and vaginal radiation is carried out first. With few exceptions this results in disappearance of the occlusion and the tandems may then be inserted.

Complications of Radiation Treatment

A—During Treatment.

1. Injury to skin and subcutaneous tissues. Early injury to the skin consists of an "epidermitis" which expresses itself as a moist denuded surface caused by a complete loss of the superficial layers of the epidermis. Late skin injury consists of telangiectasis, atrophy and, in extreme cases, ulceration. This can be avoided by prolonging treatment to 5-6 weeks, using limited surface areas, and low intensity.

Connective tissue damage, including injury to blood vessels, shows up in the form of œdema. This may occur within 24 hours of treatment or later. Its appearance is an indication for immediate reduction of intensity of treatment or of the size of the field.

2. Radiation sickness occurs in some patients and affects their general health..

3. Bladder injury is rare if reasonable precautions be taken during treatment. A mild irritation of the mucosa may occur during treatment, however the symptoms are usually transient. Small superficial erosions of the mucosa are sometimes seen on cystoscopic examination, but they apparently heal quickly and result in no serious damage.

4. Rectal injury. Rectal mucosa is very radio-sensitive and if care is not taken with the vaginal radium application sloughing of tissues and a recto-vaginal fistula may form.

With external radiation, slight diarrhoea without abdominal pain may occur during the third week. It indicates that the level of tolerance has been

reached, but does not indicate a change in radiation except the reduction of the size of the skin portal. The clinical manifestations of overdosage are: anorexia, vomiting, diarrhoea, tenesmus and rapid loss of weight.

5. Infection during radiation is the most important complication. The activation of latent haemolytic streptococci is a real danger and is associated with 1 to 2% mortality.

B—Late—as a result of radiation.

1. Fibrosis of the pelvic tissue. This is a chronic reactive process and may be accompanied by occlusion of the vagina and cervix followed by pyometra, vaginal sclerosis, rectal obstruction and occlusion of the ureters.

2. Postradiation intestinal obstruction resulting from benign stricture of the intestine.

Results

Ontario Institute of Radiotherapy, Toronto Survival Table of Disease 1929-40

Stages	No. of cases	Living at end of 3 years	Living at end of 5 years
I	52	76.9%	71.0%
II	159	50.9%	40.0%
III	208	27.3%	21.4%
IV	109	12.8%	4.2%
	528	36.5%	29.7%

Cancer of the Cervix complicating pregnancy.

This is a rare condition. Werther reports it as occurring once in 2000 cases, while Glockner once in 15,000. The reason for this rarity is that cancer is a disease of later life, while pregnancy is more common in younger women.

When pregnancy does supervene upon cancer, it has generally been believed that the growth is accelerated by the general increase in pelvic vascularity. However, recent studies of Peham, Amreich, and Martzloff, indicate the opposite to this.

The treatment of this condition varies in different centres. The problems that must be faced are: (1) what to do if the cancer is recognized in the earlier months of pregnancy, (2) what to do if the child is near viability and the prognosis of the mother is hopeless and (3) what to do if it is recognized when the child is viable. In the first case the best procedure seems to be to treat the complication regardless of the pregnancy. A subtotal hysterectomy is done and following this the cervical stump is treated with radium and external radiation is given. Some prefer to do a total hysterectomy, but this tends to be a more difficult operation at this time and the mortality rate is perhaps higher.

If the child is viable a caesarian section should be done, followed by a total hysterectomy.

If the maternal prognosis is hopeless and the child is near a viable age, then it is perhaps best to temporize and get a living child by caesarian section and try to help the mother as much as possible with hysterectomy and radiation.

SUDDEN DEATH

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Death, whether it be anticipated or not, is an unhappy event. Man clings to his mortal frame in spite of the grim and sordid existence it may offer. Likewise the doctor does all he can to aid and abet him in this biological urge. When the inevitable happens, and the body is laid out for post-mortem examination, the causes for the final breakdown sometimes come before us in such a variety and complexity of character as to defy complete solution.

In most cases a preceding illness of days or months offers clinical clues that makes the pathologists's problem merely one of fact finding. Sudden deaths, however, sweep down like a northern blast to snuff out the flame of life in a shocking and tragic manner without warning and without time to comprehend or collect one's thoughts. Added to this may be the mental anguish of dying alone. They all present problems to the pathologist and must be approached with caution and skill.

Sudden death is an unexpected death occurring in a matter of minutes. It may be the terminal event of a hidden or latent pathological state of some organ, such as a coronary occlusion, aneurysm, etc. Many of the cases, however, are sudden pathological as well as clinical crises which are unpredictable, such as a pulmonary embolism following abdominal operation.

The approach of the pathologist, therefore, must be cautious and unprejudiced. It is for him to observe and record, then to weave the facts together in a pattern of death consistent with the sum total of his findings.

One cannot divorce oneself wholly from the premortem story of the case. An empty vial, a gun, a note, an operation, legal or otherwise, the social status, the surroundings and complexities of the deceased's life, all point their finger to some tragic cause for the sudden death. Such a pointer may expedite the examination and solution of the problem. On the other hand, like the witch's lamp, they may lead one far astray into a morass of doubt, indecision, or wrong conclusions. As an example of such a possibility I am reminded of a case of Dr. Erb's where the body of an elderly man was found dead in his shack with a saw cut across the back of his neck. At first glance the case appeared to be one of murder and the police were prepared to make an arrest. Dr. Erb, however, proved, to the satisfaction of everybody, that it was a case of suicide, the man being mental.

Bodies removed from the water must not be presumed to be drowning cases. The body of a young girl removed from the river Thames near London, Ontario, was presumed to be a simple case of drowning until someone noticed that the pubic hair had been shaved off. A postmortem was ordered by the Coroner and an up-to-this-time reputable doctor was sent to jail for twenty years for aborting the girl and causing her death. This case might serve further to illustrate a cause of sudden death. The doctor, while curetting the uterus, inadvertently perforated it and down through the hole came several feet of bowel which he pulled out by hand and cut off. He then packed the uterus and, to forestall the inevitable pain and shock,

ordered the girl to be given 1 gr. morphine every hour. After 7 gr. had been given the forced administration of chloroform was resorted to until the unfortunate girl finally died. Death was not due to drowning.

Where no clues at all are present, as when a presumably normal person is found dead, one inevitably approaches such a case in a speculative mood. For example, in the younger age group one naturally thinks of such conditions as congenital aneurysm and status lymphaticus, whereas, in the older age group, coronary disease or ruptured aneurysm come into mind. If the face and neck are cyanotic asphyxia is immediately suspected.

Poison cases are sometimes dramatic in their suddenness and obscure in their ending. Some years ago a woman received through the mail a beautifying powder in a package with the name of a reputable drug firm on the outside. The son jokingly said he would try it out for her and, in a matter of minutes, while going out the door to work, he was seized with violent spasms, tonic and clonic, and died. Here the analyst, Professor Rogers, had a lead and very soon proved it to be a case of strychnine poisoning. As the iron net of the law closed in on the woman's estranged husband he sought a way out by the use of gas. His body was found by the stove with the unlighted gas of the oven flowing into the room, and an empty bottle of whisky by his side. Carbon monoxide poisoning, like cyanide, manifests itself sufficiently by the general appearance of the body and the premortem story to make its identification fairly easy. The lifelike appearance of the dead body in cyanide poisoning is striking, and simple chemical tests serve to verify the presumption of this type of death.

These poisons are readily recognized and identified later by chemical analysis of blood and organs. There are other poisons, however, equally effective and speedy, which leave no trace such as some of the alkaloids which oxidize and break down, or some of the volatile ones such as chloroform, ethyl chloride, etc. The autopsy findings may be negative and one is then obliged, by a process of exclusion, to call it a case of poisoning of unknown type.

This naturally leads us to a consideration of anaesthetic deaths, most of which are totally unexpected and, therefore, extremely shocking. An anaesthetic should be classed as a definite risk and should be given only by those skilled in this branch of medicine, wherever possible. The premortem history of the anaesthetic stands out as important evidence in this form of death and, along with the negative post-mortem findings of any other cause, makes it a reasonably sure case of death from anaesthetic. The volatile anaesthetics of course, cannot be detected unless samples of blood, brain, etc., are taken very soon after death. Even then the quantity of anaesthetic in the body, which would be paramount to the case, would be very difficult to determine. Many of these deaths are straight cases of anaesthetic poisoning from overdosage while others are due to complications through accident, fortuitous circumstances, or straight lack of judgment or skill. I am referring here to such cases as choking from aspiration of vomitus while the anaesthetic is being given, or the plugging of the airway by blood clots in throat operations. A striking and dramatic case of this type occurred a few years ago when a young girl, age 7, was having

an emergency appendectomy. The anaesthetist was obliged to use the suction pump to remove mucus from the throat and inadvertently knocked out one of the lower incisor deciduous teeth. The child, on the cessation of the anaesthetic, suddenly went into a spasm and no amount of stimulant or artificial respiration could revive her. At autopsy the displaced tooth was found to have lodged in the pyriform sinus and there set up a continuous spasm of the glottis till death occurred. This view was accepted by the jury.

Asphyxia is one of the common causes of sudden death. Of these, drowning stands out as a grim reminder of the carelessness and unpreparedness of man for contact with a watery medium. Death is due to asphyxia resulting in the blocking of the air passages. Any fluid substance may do this and amounts sufficient only to occlude the nose and mouth will suffice. A person in a drunken stupor may roll face down into a shallow pool of water and drown. The non swimmer may fall into a large body of water and, being unable to extricate himself, sinks and his air supply is shut off. The expert swimmer may become temporarily incapacitated from injury or illness and become unconscious. He is at the mercy of this unnatural media and succumbs quickly to its smothering effect. The actual mechanism of drowning is different from that stated in most text books. The finding of water in the lungs is held up as the sign "sine qui non" of drowning. From my own personal experience I find in the vast majority of cases there is no water whatever in the lungs. It is found in the stomach. This is to be expected for water, as of any foreign body, is not supposed to go into the respiratory system so nature diverts it to the stomach by swallowing and, automatically, closes off the air by a spasm of the glottis. This spasm persists as long as there is water in the glottis and diversion to the stomach keeps up till death supervenes. I am often asked how long it takes for death to occur in drowning. I believe anywhere up to ten minutes. The time required to cause death by asphyxiation will depend upon the oxygen tension of the blood at the beginning of the occlusion, and the rate at which the oxygen already in the blood is used up. A man struggling before and after immersion will not survive more than a minute or so. Effective resuscitation is going to depend upon relief of the spasm of the glottis and the immediate ventilation of the lungs.

Other forms of asphyxiation, such as smothering, choking, strangulation and throttling, present much the same postmortem picture plus local evidences of injury, indicating the particular type. In throttling cases, and sometimes strangling and h,anging, fractures of the hyoid bone and superior cornu of the thyroid cartilage present striking evidence of direct violence to that part.

One other case serves to illustrate asphyxia of another type. Early one morning an old, rather obese woman, was found doubled up on the floor of the university library with the body hanging over a bench in such a manner that the head was acutely flexed on the chest. The face and neck were quite cyanotic, indicating death from asphyxia. A window just above had a large opening broken through it. Apparently in a drunken stupor she had fallen through this window, which was at ground level, and was knocked unconscious. She had fallen over the bench in such

a way that the head became jammed into this extreme flexed position and, with the airway occluded, she died during the night.

Many sudden deaths result from massive haemorrhages either into the body cavities or externally. Gunshot wounds through large vessels may end this way and a number of other traumatic injuries likewise terminate in severe haemorrhage. This is very liable to occur in crushing injuries of the chest where one or more of the larger vessels are torn and death supervenes very quickly from a haemorrhage into the thoracic cavity. A rather unique case of this type occurred during a box lacrosse game at the Maple Leaf Stadium, when the deceased was struck a blow over the front of the left chest. At postmortem a bruise about ¾" x 1½" was found on the skin surface over the apex of the heart, in the 5th interspace on the left side. Internally the pericardial sac was found distended to capacity by a large blood clot and careful examination of the heart showed bruising and rupture of one of the superficial vessels of the left ventricle anteriorly. In retrospect it would seem that a blow from a lacrosse stick had occurred during systole of the heart, when the apex of the left ventricle was lying in direct apposition to the intercostal muscle. The force was transmitted directly through the chest wall to the heart and the superficial coronary vessel ruptured.

A ruptured aneurysm may occur without the slightest warning and death from haemorrhage immediately follow. Haemorrhages from a ruptured varix in corrhosis of the liver, ruptured ectopic or ruptured uterus are generally anticipated and, therefore, not within the scope of this paper.

All too frequently we are confronted with a vascular catastrophe of another type, viz. embolism. A woman, it may be, who has had a hysterectomy with excellent results is told she may go home. She gets up out of bed to dress and, suddenly, without warning, falls back gasping for breath and, in a matter of minutes, is dead. The autopsy reveals a large embolus occluding the pulmonary artery. During convalescence thrombi sometimes form in the veins of the legs and the extra effort of dressing dislodges them and they quickly pass up through the inferior vena cava and right heart to lodge in and occlude the pulmonary circulation.

Fat embolism following traumatic injury to bones or fat tissue manifests itself before death and therefore must be excluded from this group.

Air embolism deaths occur sometimes with dramatic suddenness. In my experience they have all been cases of attempted abortion. Death follows in from two to ten or fifteen minutes after the start of the intra-uterine injection. The abortionist, as a rule, uses a Higginson syringe with the object of injecting some soapy antiseptic fluid up into the uterine cavity to separate the membranes from the uterine wall and thus initiate labour. The air in the empty syringe of course is first pumped into the cavity. This blows the uterus up like a football and, in separating the membranes, it sometimes partially separates the placenta. The open sinuses thus exposed offer an escape for the confined air and it rushes into the venous sinuses of the uterus and through the inferior vena cava into the right heart where it is churned up with blood to form a blood-air-foamy mass. Air bubbles have a

high surface tension and in the matter of minutes block enough capillaries of the lung to stop circulation and cause death.

Sudden death from fire is usually a death from shock. Many, however, are cases of death from carbon monoxide where the deceased has got caught in a burning building with insufficient air to cause complete combustion. The shock cases are those that have been caught in a blast of flame and so severely burned that death is very rapid. This type of death is illustrated by the case of the young man at the gas station who was helping himself to some gas for his car. The hosepipe was leaking rather badly and in the process his clothes became soaked with gasoline. From habit he drew out a cigarette and in scratching a match on his pant leg ignited his clothing and was soon a mass of flames. He died very quickly from shock.

Electrocution represents one of the common forms of sudden death. Whether the shock is due to a high voltage or low voltage current is of some importance. The mechanism of death is different. The high voltage currents tend to paralyse the respiratory centre of the brain. That is why the Ontario Hydro Electric officials have had such good success in their resuscitative measures. Their figures have shown that 90% of them can be saved if resuscitation is started within one minute of the shock. High voltage currents also tend to throw the victim clear of the line so that the current does not flow through the body for any length of time.

On the other hand, low voltage currents present a different problem. Here the victim is not thrown clear of the circuit but is liable to be held there by the contractures of the flexor muscles. Furthermore, the current seems to affect the heart rhythm directly and set up a ventricular fibrillation. A few minutes in such a circuit suffices to cause death. Low voltage currents are found in the circuits of home and factory, hence the reason for so many deaths of this type.

Many electrical devices of the home, including lighting fixtures, toasters, sunlamps, etc. are a deadly menace through defective wiring. A bare wire touching the frame inside, if on the positive side of the circuit, renders the whole lamp "alive." Contact between this and any ground such as radiators or water pipes completes a circuit which may cause electrocution. An example of such is seen in the case of a doctor some three years ago who was taking a sunlight treatment while lying in his bath. He leaned over to turn off the switch and, on touching the frame, was immediately electrocuted. Subsequent examination of the lamp by the Hydro officials showed a bare wire in contact with the frame, making the whole lamp "alive." The body of course was grounded in the bath water. These defects in wiring are not known until a ground is established to complete the circuit.

Severe trauma of course stands out as a prominent cause for sudden death. It may be decapitation from being run over by a train, or a severe beating up by a "thug." These all depend on destruction or damage to some vital organ such as brain, cord, heart, etc. The injury may be a gunshot wound, a stabbing wound, a dislocated neck or a severe crushing injury. No matter which, death is sudden from shock, haemorrhage, or violence to an important organ or nerve centre.

Of the natural causes for sudden death coronary disease occurs with a very disturbing frequency, particularly amongst the middle aged group. It is founded

always on a diseased coronary artery. Every man over the age of fifty has coronary sclerosis. Some have it marked, others just moderate. The sclerosis, with resulting stenosis, may in itself become a potential risk. Under normal circumstances the lumen of such a vessel may be of sufficient calibre to carry on adequate flow of blood. Under stress, however, whether emotional or physical, a relative anaemia of the myocardium sometimes occurs sufficient to set the heart into a ventricular fibrillation. Fully 70% of our Coroner's cases come into this group. On the other hand, there may be a sudden and complete occlusion of the coronary artery by a thrombus. The thrombosis, however, is always preceded and based on a sclerosed vessel, usually an atheromatous plaque. Stress and emotion probably play no part in these cases. As an example of the stenosis type I am reminded of the case of the waiter who was assaulted by an inebriated Indian in the basement of his restaurant. He died during the struggle of an infarct of the heart. The physical injuries were minor and not responsible for his death. He had, however, pipestone coronary arteries with small lumina. There was an area of softening of the left ventricle. This was undoubtedly a coronary death under physical stress.

The other type is illustrated in the case of the young man, aged 19 years, who was found dead in bed. In his case the descending branch of the left coronary was found completely occluded by a fresh thrombus with a softened infarcted area in the left ventricle about 5 cm. in diameter.

There are a number of other causes for sudden death such as status lymphaticus, anaphylactic shock, œdema of the glottis, etc. Of these, the first has excited considerable controversy. My own experience with this type of case is not very great and I am obliged to draw upon Dr. Erb for an example. One of a group of children who were playing on the road, sidewalk, and lawn, was struck down by a motor car and injured. He did not die but a little lad watching the accident from the lawn himself fell dead. The postmortem, of course, revealed no evidence of mechanical injury but it did show the child to be of the typical constitution of status lymphaticus. There was an enlarged thymus and thin-walled hypoplastic aorta, and marked general hyperplasia of the lymphoid tissues of the body. It would seem to me that this is a straight case of death from fright in a constitutional case of status lymphaticus. This condition, however, is not as common as it is generally believed.

Sudden death is not a definite entity. It is a precipitous terminal event, shocking and tragic to the family, confusing and enigmatic to the attending physician.

Certification of the death is the responsibility of the Coroner. Before doing so he may ask the pathologist or chemist to aid him in deciding whether life was taken at the hands of one of his fellow men, or whether it was death from natural causes.

CARCINOMA OF THE RECTUM

A. H. H. MALCOLM

Cancer in general has become second only to heart disease as a cause of death. In 1934, 15.5 p.c. of all deaths due to cancer were the result of cancer of the bowel. Since more than 56 p.c. of the carcinoma of the intestinal tract is located in the recto-sigmoid junction and rectum, the importance of cancer of the rectum as a cause of death is born out sharply. Next to the stomach, the rectum is the most common site in the gastro-intestinal system for cancer. More over, it comes to the notice of the surgeon, more often, later than a growth at any other site in the tract. It is commoner in men than women in the ratio of 3.2 and generally occurs after middle age.

I. *Etiology*:

The specific cause of carcinoma of the rectum has not been determined but several predisposing factors have been found. The two main factors are:

1. Heredity:

A definite familial tendency for this condition has been observed but the law it follows is, as yet, obscure. Heredity plays a predominant role in many cases.

2. Chronic irritation of the membranes:

Since the rectum and recto-sigmoid junction, along with the oesophagus, lesser curvature of the stomach and anus are subjected to constant trauma, this has been cited as one of the underlying causes for carcinoma. Conditions which accentuate the trauma received by the mucous membrane are single or multiple papillomata, stricture and chronic constipation or dysentery.

II. *Pathology*:

1. *Gross Features*—

The carcinomatous growth may vary as to site and type of gross structure and may produce varied secondary effects on the bowel.

a) *Site*:

In order of frequency, the growth may be found in the following locations.

1. The recto-sigmoid junction
2. The ampulla of the rectum
3. The lower 5-7 cm. of the rectum and anal canal.

The anterior and posterior walls are more often affected than the lateral walls.

b) *Types of gross structure:*

There are three types:

1. The fungating, friable mass projecting into the lumen.
2. A fibrous annular constriction with comparatively little new growth or ulceration.

3. An ulcer, with a hard raised margin, which is usually of considerable extent. The ulcer may also be the result of the breakdown of either the preceding two types.

c) *Secondary effects due to obstruction:*

1. Above the obstruction—The bowel is dilated. The walls are hypertrophied in proportion to the chronicity of the case. The mucous membrane is thickened and catarrhal stercoral ulcers usually develop as a result of the superficial erosion caused by fecal masses. Sacculation or pouching may occur.
2. Below the obstruction—The rectum is collapsed and may be quite oedamatous.

2. *Microscopic Picture—*

Adenocarcinoma is the commonest of the malignant growths of the rectum. Scirrhous carcinoma is the next commonest and occurs most frequently at the recto-sigmoid junction. Secondary mucoid degeneration occurs in a varying number of cases.

Adenocarcinoma of the fungating variety is most likely to be well differentiated, with glandular tissue predominating. The annular infiltrating tumors are composed mainly of dense fibrous tissue stroma.

3. *Spread—*

Carcinoma of the rectum is noted for its very late metastases which makes for a bright prognosis, even if the condition is diagnosed late in its course. The tumor may spread locally or metastisize to distant organs.

a) *Local spread*:

In the earliest stages of its development, the growth is confined to the mucosa and submucosa. Beginning with a small flattened surface, its growth is progressive in all directions.

1. Into the lumen—this is the easiest direction of growth.
2. Up and down the gut wall—At first the extension takes place in the mucosal plane of the wall. Penetration of the muscular layer is very slow, but once having penetrated, the growth again extends along the long axis of the gut in the subserous layer.
3. Local lymphatic channels—These may contain tumor cells and appear like opaque white beaded lines, often mistaken for tuberculosis.
4. Involvement of neighbouring structures—this may occur in the late stages. Structures that may be involved include cellular tissue, the sacrum, pelvic vessels and nerves, vagina and uterus, prostate, bladder and ureters. In 42% of cases the bladder is affected by the growth A fistula may open into the vagina or bladder.

b) *Distant Metastases*:

Metastases occur in late stages of the disease and are comparatively rare. Organs most likely to be involved are:

1. Lumbar lymph glands.
2. Liver—by way of the portal venous system.
3. Retroperitoneal and mesenteric lymph glands.
4. Inguinal lymph glands—in cases in which the anus has been involved.
5. Peritoneum and surfaces of the pelvic organs—as a result of implantation of carcinomatous cells which have penetrated the serous coat of the rectum.

III. *Signs and Symptoms:*

1) *Early, before obstruction—*

The few symptoms provided at this stage obviously make the diagnosis of carcinoma of the rectum difficult. About the best that they can do is merely direct attention to the bowel which, if the doctor is alert, will be carefully inspected in the course of the physical examination. The symptoms which may occur at this early stage in order of their most common appearance, are as follows:

1. Bleeding:—Blood may be seen by the patient both with and between bowel movements. This symptom is significant in that it is most frequently the first indication of carcinoma of the rectum. Occasionally it may manifest itself as a haemorrhage. The blood will appear as bright red streaks on, or as patches within the stool. Quite often offensive blood stained mucous is passed.
2. Change in bowel habits:—Constipation has been found to occur in 55 p.c. of cases and diarrhoea in 20 p.c. Attacks of diarrhoea may alternate with the constipation. Tenesmus and abdominal discomfort may be the first symptoms to bring the patient to the doctor.
3. Pain:—This may be dull and dragging but usually is absent at this early period.

   4. On examination:—A mass is found in the rectum which is either friable and fungating or hard with an ulcerated surface and everted margins. It is not fixed in any way and, on straining, the bowel descends as a whole.

2) *Advanced stage with obstruction—*

Along with signs and symptoms found in the early stage, those of chronic intestinal obstruction may be added.

1. Great abdominal distension with visible peristalsis.
2. Pronounced constipation with colicky pain and borborygmus which are increased by purgativation.

3. Pain and tenesmus are much more constant and severe than in early stage.
4. On examination:—A mass is found in the rectum which is either a stricture or fungating mass.

3) *Stage of involvement of neighbouring structures*—

The findings may be many and variable:

1. Neuralgic pain which may be severe and constant.
   It is caused by extension of the growth to the sacrum and sacral nerves.
2. Oedema of the legs may result from involvement of the vessels.
3. Abcess formation may take place in the pelvis, ischio-rectal fossa or buttocks and give rise to one or more fistulae which communicate with the bowel above the growth.
4. Gas or faeces may be voided from the urethra and cystitis supervene with bladder extension. In females, gas or faeces may be passed from the vagina.
5. Hydronephrosis, pyonephrosis and uremia may result from blocking of the ureters.
6. On examination:—The growth is fixed and the bowel does not come down on straining. This fixation may be only partial, though involving, for example, the bone behind or the vagina in front or it may be complete, the whole bowel circumference being involved.

4) *Late or terminal stage showing secondary growths and cachexia*—

This stage may never be reached since death may result from obstruction or sepsis. Some added features may be:—

1. Masses of enlarged glands may be felt in the lumbar region.
2. Liver—It may be large, very firm and nodular. Ascites may develop.
3. Cachexia—The patient may not lose weight at first, but, if the condition drags on, the inevitable result will be anorexia and cachexia.

IV. *Diagnosis*:

Carcinoma of the rectum is a relatively easy condition to diagnose if the proper procedure is carried out. When a patient presents himself with a history of about eight months duration and having suggestive symptoms, a *digital and sigmoidoscopic rectal examination should always be done.* A careful routine examination which includes an exacting rectal examination will reveal almost all the growths in the rectum. A diagostic error can only be caused by failure to make a proper local examination.

The main pathognomonic feature of the neoplastic growths in the rectum is that the lesion is single. Almost any other condition encountered will be associated with some inflammatory reaction, and when inflammation and infection are present, a single lesion is rarely found.

Local examination can easily differentiate carcinoma from other lesions, although in its early stages it may be sometimes difficult to differentiate the malignancy from piles or polyps, without a more extensive investigation.

Differential diagnosis includes the following:

1. *Piles*—Swollen veins may be found here. It is important to examine the bowel in every case of piles, since they often complicate cases of cancer.
2. *Fissure*—The pain is very severe and almost unbearable on digital examination. A linear ulcer with a sentinel pile is evident, while the interior of the bowel is quite healthy.
3. *Polypus*—The mass is small and pedunculated. The mucous membrance is healthy.
4. *Fibrous stricture*—The parts are indolent and there is no new growth. Bleeding on examination may be slight or absent.
5. *Prolapse and intussusception*—Inspection and palpation makes the diagnosis clear.
6. *Syphilis*—Gummata are soft, painless, and non-vascular. The ulcers are ragged, undermined and not at all indurated.
7. *Diverticulitis*—The diagnosis here is made by way of a barium enema. This will show round, varying knob-like projections along the lumen of the bowel which are most numerous in the sigmoid colon. In diverticulitis the segment of bowel involved is much more extensive and has a more concentric contour than carcinoma, which in contrast, has a shorter and sharply irregular segment. also, in the former, the gut mobility is maintained, while in the latter it is relatively immobile in late stages.
8. *Sarcoma*—Biopsy specimens are taken to differentiate this from carcinoma.
9. *Tuberculosis*—This is also diagnosed by means of a biopsy specimen. If no malignancy is found, carcinoma is not excluded since the sections may have been taken from a normal part of the lesion. Repeated sections will differentiate tuberculosis from carcinoma.
10. *Chronic ulcerative colitis*—
11. *Faecal impaction*—Rectal examination will reveal faecal masses.
12. Chronic catarrh of colon or rectum.
13. Impaired gastric digestion.
14. Impaired pancreatic digestion.

V. *Treatment*:

Each patient suffering from carcinoma of the rectum must be considered as a separate problem regarding treatment because of the many complicating and modifying factors which may influence this treatment. Mortality can be kept down and the horizon of operability can be extended, if the following factors of safety are closely adhered to.

1. Careful attention to the detail of preoperative treatment.
2. The selection of a proper operation for the patient.
3. Care in the choice of anaesthesia.
4. Rigid adherence to a standardized post operative regime.

A) Operability—*Indications for types of treatment.*

(1.) *Extrinsic influences*

These include the general condition of the patient and certain conditions local to the neoplasm.

1. *Age and Sex of patient*:

Carcinoma grows and spreads much more rapidly in young patients because the lymphatic channels are more patent. Surgery is seldom worth while in these cases. The risk with surgical treatment increases proportionally in patients over 60 years of age but this is somewhat diminished by using a less radical operation. Women have a better chance of survival from rectal carcinoma than men, due to the fact that the female pelvis is much more resistant to infection and the other pelvic organs are not so intimately related to the anterior wall of the rectum as in the male pelvis.

2. *Loss of weight and anaemia*: Excessive loss of weight may indicate extensive metastatic involvement of distant organs thus making surgery impossible.

3. *General debility and associated chronic diseases such as diabetes and tuberculosis*: Operations are not excluded because of these unless they are very severe and are an immediate danger to the patient's life.

4. *Obesity*: Obese cases are greater risks and have a poorer outlook from the standpoint of ultimate cure than those patients of normal weight. If the onset of obesity is rapid, faulty metabolism and lowered resistance are suspected. Obesity is also a mechanical handicap during the operation. Malignant growths spread much more rapidly in obese patients.

5. *Situation and duration of growth.*

6. *Fixation of bowel precludes resection.*

7. *Obstruction*: This must be relieved by medical or surgical means to prepare the patient for operation, if it is indicated.

8. *Size and direction of growth*: The size of the growth bears no relation to the operability or curability nor the degree of metastatic involvement.

9. *Glandular metastases*

10. *Perforation*

(2.) *Intrinsic influences*:

This is probably the most important factor from the operability and prognostic viewpoint. It is the degree of differentiation of the carcinomatous cells in the growth. The activity of the neoplastic cells is the primary factor in the decision between longevity and early recurrence. Involvement of lymphatics glands directly draining the area of the neoplasm, is proportional to the grade of malignancy. By Broder's method of classification, the degree of malignancy of growth cells is graded by numerals from one to four with the most differentiated and therefore least malignant cells at the lowest end of the scale and the most undifferentiated and therefore the most malignant cells at the highest end of the scale.

B) Preoperative and Post operative Treatment.

Many patients are admitted in a state of lowered resistance and many appear inoperable, but with good measures of preoperative rehabilitation they may respond so well as to withstand a radical surgical operation. Thus, preoperative treatment is important. It may consist of the following:

1. *Hospitalization*:—This should be done for the full period of preliminary preparation, if possible. Seven days is the minimal preparatory period.
2. *Obstruction*:—About 90% of obstructions of a chronic or even of a subacute variety can be relieved by medical measures.
3. *Purgation*:—Mild laxatives, such as milk of magnesia or a mild saline cathartic may be used for the first 48 hours in cases which are not complicated by obstruction or dehydration. Prolongation of this treatment causes irritation of the bowel interfering with cleansing.
4. *Irrigation*:—Warm physiological saline solution should be irrigated through the bowel every 12 hours up until 24 hours before operation. Reason for doing this is twofold:—it removes bowel contents and at the same time reduces the oedema and inflammation at the site of the partial obstruction.
5. *Measures of rehabilitation*:—These are directed toward ocercoming the toxemia, dehydration, malnutrition or anemia with which the patient may enter the hospital.
6. *Diet*:—The caloric content should be quite high, about 2500-3000 calories, to overcome malnutrition. It must have a low residue and just prior to the operation it should consist entirely of fluids. The carbohydrates content should be high, the protein lower, and the fat almost eliminated. Pablum is an excellent food at this period. Urine and blood sugar should be checked regularly.
7. *Sulphasuccidine*:—This drug, because of its property of poor absorption, is used extensively as a preoperative prevention against infection during the operation. When no preliminary colostomy is required, sulphasuccidine is given in 3 gm. doses every four hours by mouth, for approximately three days prior to the operation. When a colostomy is present, a solution containing 2 grams of the drug is irrigated through the lower segment of the bowel twice a day. In this way, many organisms, especially B. coli, are killed about the field of the operation. It may be noted here that sulphathiazole powder should be sprinkled about the operative field prior to closing it up.
8. *Urinary Tract*:—It is important to know prior to any operation, whether the growth has invaded the urinary system. Post-operative disturbances, which occur in a large number of cases, should also be watched for. Elderly patients with hypertrophied prostates and residual urine should be treated just as though they were to undergo a prostatectomy.

Post Operative Treatment

1. *Immediate Care*:—The Trendelenburg position should be maintained for 12-24 hours after operation and blood transfusions can be given if the patient is in poor condition.

2. *For the first 48 hours at least*:—Nothing should be given by mouth. Hypodermoclysis of normal saline solution amounting to 2,000-3,000 cc. in 24 hours is given. 1,000-2000 cc. of 5-10% dextrose in normal saline should be administered intravenously. Morphine may be used to allay pain. Strict oral hygiene must be carried out in an effort to prevent parotitis.

3. *Decompressive measures*:—The colostomy.

The loop colostomy can usually be left unopened for 48 hours and frequently for 5-7 days. When distention occurs it may easily be relieved by puncturing the colostomy with a cautery and inserting a catheter into the proximal loop. After the required time the anterior two-thirds of the colon loop is cut and if the colostomy is to be permanent, it may be cut through on the twelfth day. Postponing the opening of the bowel decreases the gross infection of the subcutaneous tissues about the colostomy. This may definitely hasten the patient's recovery or hasten the preparations for a second stage operation.

When the patient is about to resume normal life, the permanent colostomy may be protected by a simple corset with a removable inner rubber pad which may easily be cleansed.

4. *Diet*:—This must be constipating at first. It must have a low residue. Normal diets can be resumed after a time, but should not be allowed to become very fluid at any time.

5. *Penicillin*:—100,000 units per day of penicillin intravenously will further prevent or control post operative infection.

6. *Wounds*:—Continuous and frequent inspection must be given the incision and proper antiseptics and packings used.

C) Choice of Operation:—

Surgery is the treatment of election in most operable cases of carcinoma. There are several opinions as to the type of operation to be used.

1. *Combined abdominoperineal and perineo-abdominal resection in one stage*:

This is considered to be the operation of choice by Miles of the Cancer Hospital of London and his associates, but is contra-indicated in the feeble, owing to its severity. They advocate its use in all cases and consider it especially suitable for those in which the disease extends above the third sacral vertebra. The advantages of this procedure are:—

1. It allows for a thorough exploration of the abdomen for metastatic growths.
2. It makes complete removal of lymph glands and cellular tissue from the pelvis possible.
3. The bowel can be removed much more freely.

The principle of the operation is to first explore the abdomen, then divide the sigmoid colon and leave the proximal end as a colostomy if a preliminary one has not been made and finally push the distal segment of the bowel into the hollow of sacrum. The abdomen is closed and the lower segment and involved structures are removed by way of the perineal route.

2. *Combined abdominoperineal and perineo-abdominal resection in two stages:*

Indications for doing the two stage procedure are mainly those associated with inability of the patient to endure a one stage operation. These may be general or local complications and have been discussed previously. The principle behind this operation is essentially the same as the one stage except that the abdominal and perineal parts are separated by a rehabilitation period.

3. *Surgical Diathermy:*

Diathermy was first used by A. A. Strauss of Chicago as a palliative measure in the treatment of inoperable cases of carcinoma of the rectum. He found the clinical results to be so satisfactory that he began using diathermy as a method of treatment in all cases of cancer of the rectum. The results from this were comparable to other surgical treatments. Out of 42 patients treated, only four deaths, or a 9.5 per cent mortality rate, were the result of diathermy procedures.

There are several excellent advantages to using this procedure. Most significant among these is that the colostomy can be eliminated, which is a great blessing for the patient. The normal function of the rectum can be retained. The shock and danger of infection, often complicating radical surgical procedures can almost be eliminated with this treatment.

The technique is relatively simple. For several days preoperatively the patient is given daily, one ounce of magnesium sulphate in seven ounces of water divided into sixteen doses. This is followed by enemas and irrigation of the lower portion of the sigmoid colon and rectum and finally the lower portion of the sigmoid colon and rectum are emptied by a suction apparatus. The rectal sphincter is stretched to admit a glass cylinder which is passed up the rectum to the carcinomatous area. The whole area is electro-coagulated and any blood or smoke can be aspirated with an intestinal suction apparatus. Superficial coagulation is the best procedure. This can be repeated several times at two to three weeks intervals if necessary. By using this superficial coagulation much less stricture and scar formation result. If these do occur they can be resected later.

4. *Resection of Rectum with reconstruction of the canal.*

In the past few years a new outlook in the treatment of certain cases of carcinoma of the rectum has been taken. Several prominent surgeons, including Dr. Gordon Murray, a member of the surgical staff at the Toronto General Hospital, have advocated a type of operation for selected early cases of rectal cancer which retains the normal function of the anus, thus eliminating the colostomy.

There are several indications for the use of this procedure. The growth must not be fixed to surrounding structures and must not be producing obstruction. It must not have metastases. It must be either a cauliflower or an ulcerative type of lesion, involving not more than one-third to one-half of the circumference of the rectum. In selecting cases for this operation, the best cases are those in which the growth is above the anal canal mucosa and the sphincter and can be easily palpated through the rectum. It is better when the upper limits of the growth can be felt and when the growth can be moved freely on the surrounding structures.

The advantages of this choice of operation are excellent. The obnoxious colostomy can be dispensed with and normal bowel function retained. Operative shock and infection is greatly diminished. Post operative complications are reduced.

The operative technique is much simpler than most other surgical procedures. Through an incision, made from the third spine of the sacrum to within an inch of posterior anal margin, the coccyx, the fifth and half the fourth sacral bodies are removed. After preliminary surgery, the rectum and sigmoid are divided well below and above the cancer area and this segment, along with its surrounding pararectal fascia, lymph glands and lymphatics, is removed. An end to end anastomosis is done between the lower end of the sigmoid and the upper end, of the remaining rectum. A hard rubber tube 5/8 inch in diameter is passed into the rectum, by way of the anal canal, past the site of anastomosis and into the proximal segment. It is stitched to the anal margin. Thus no colostomy is required.

D) Palliative Treatment

Far advanced cases in which radical surgical treatement is out of the question can have palliative treatment. This method of treatment may be necessary for various reasons, the growth may be fixed to the bladder, prostate or ureters or extensive metastasis may be found or the patient may be extremely debilitated.

About the only treatment that can be given is soft food with little residue, daily bowel washings using a soft tube and olive oil enemata occasionally. A colostomy should be done for obstruction.

E) Radiotherapy

Carcinoma of the rectum is primarily a surgical disease and for that reason, radiotherapy must take an insignificant role in its treatment. Often radiation in combination with surgery has had good effects. Radiotherapy, alone or in conjunction with a colostomy, has resulted in only a very small percentage of five year cures, but is often used to improve symptoms in palliative cases.

Variation in sensitivity, in size, extent and location of the growth makes standardized radiation technique impossble. Experience has shown that papillary growths do better under irradiation than annular forms. The opportunities for the use of radiotherapy here are limited. Often in early cases where conservative surgery has been unsuccessful and radical surgery cannot be used, radiation may sometimes be successful. Preoperative radiation has been used to reduce the bulk of the growth in borderline and early inoperable cases and thus render a radical operation possible.

That surgery still remains the method of choice in operable cases is owing largely to the fact that rectal lesions are predominantly radio-resistant, are frequently inaccessible and are frequently surrounded by more or less radio-sensitive tissues.

VI. *Prognosis*

The immediate mortality during excision of the rectal carcinoma is about 15 p.c. Of those recovering from the operation 60 p.c. survive for three years or

longer. The prognosis of survival is very bad in cases where the anus is involved. Such cases seldom ever survive three years.

When recurrence takes place, in about 66 per cent of the cases it does so within two years of the operation. The site of recurrence in 72 p.c. is local in or around the rectum, in 24 p.c. it is in the form of visceral metastases and in 4 p.c. it is in the lymphatic glands. The average length of life of those in whom recurrence occurs is about two years.

It is to be noted that the average duration of life with treatment is twice as long in cancer of therectum as in cancer of the colon.

* * *

I wish to express my gratitude to Dr. Gordon Murray for his kind suggestions and constructive criticisms.

I also wish to thank Dr. R. J. A. McComb for his gracious guidance.

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Abstracts

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MEDICINE I

W. R. Moses "THE EARLY DIAGNOSIS OF PHLEBOTHROMBOSIS" New England Journal of Medicine Feb. 28, 1946.

STATISTICS from many sources emphasize that bland phlebothrombosis is very common in hospital patients and very serious, being the main cause of pulmonary embolism. The difficulty in this condition is not treatment, which consists simply of ligation of the vein, but early diagnosis. Venography is a poor diagnostic aid for various reasons. Homan's test—pain behind the knee on forced dorsiflexion of the foot—gives an excess of both false positives and false negatives. A new diagnostic test is described:

(1) Search for tenderness in the calf by firm antero-posterior compression between fingers and thumb.

(2) If tenderness is elicited by (1), exert lateral compression between fingers and palm at the area involved. This maneuver will produce much less tenderness than (1) in an early case of phlebothrombosis.

(3) Do a brief neurological examination of the limb to eliminate the possibility of muscle tenderness due to peripheral neuritis.

The author finds from his clinical experience that this test gives few, if any, false results.

N. K.

MEDICINE II

THE HEREDITARY AND FAMILIAL ASPECTS OF EXOPHTHALMIC AND NODULAR GOITRE. Lawrence Martin; with genetic note by R. A. Fisher. Quarterly Journal of Medicine Vol. XIV No. 56; Oct. 1945.

IN a study of 201 cases of goitre, 90 of which were exophthalmic, and 111 of the nodular type both toxic and non-toxic, the author has brought to light evidence of factors relating to the hereditary and familial aspects of the goitre syndrone. The majority of his cases were studied chiefly from the central, south, and east parts of England, with a few from the outlying districts.

In reviewing these cases he confirmed the general experience that women suffer from goitres of all types more frequently than men, and to suggest that those with exophthalmic goitre tend to have relatives affected by it, whereas those with the nodular type had goitrous relatives almost exclusively affected by simple or non-descript goitre.

R.A. Fisher in his genetical note in this article pointed out evidence which strongly suggests the inheritance of a recessive factor favourable to the occurrence of exophthalmic goitre, but that it does not indicate any inherited trait in the nodular type, although, by virtue of its limited scope, does not exclude the possibility. Martin from his study suggests that the inherited liability may be a personality type characterized by a constitutional nervous instability.

As a result, Martin believes, and has partly shown, that there are various casual factors in each type, and that one should not regard the condition as a purely thyroid defect or weakness, but as a syndrome or mosaic of symptoms whose ultimate cause may well reside outside the thyroid gland.

B. B.

MEDICINE III

Activity of Synthetic Lactobacillus Casei Factor ("Folic Acid") as an Antipernicious Anemia Substance: C. V. Moore, Olga S. Bierbaum, A. D. Welch, and L. D. Wright: J. Lab. and Clin. Med. **30**, 1056 (1945.)

Moore and his associates were able to induce clinical and hematologic remission in two patients with Addisonian pernicious anemia by orally administering daily for ten days thirty milligrams and one hundred milligrams of synthetic folic acid. One patient with pernicious anemia of pregnancy and one with nontropical sprue (macrocytic anemia) reponded similarly to daily intravenous injections of twenty milligrams of the preparation. The authors point out that although these results indicate that L. casei factor possesses anti-pernicious anemia activity, the material must be proven effective in smaller doses administered parenterally over a longer period of time before it can be accepted as acting similarly to or identically with the effective principle in extracts of liver.

W. G. B. C.

MEDICINE IV

Penetration of Penicillin Into Foci of Infection. I. E. Gerber, G. Shwartzman, G. Baehr: J. Amer. Med. Assn. **130**, 761-4 (1946.)

As a result of their experience with penicillin, the authors made the following conclusions: 1. Large doses of penicillin injected intramuscularly at three-hour intervals have been found generally to be more effective than the same total daily dosage administered intravenously. 2. An advantage of the intramuscular administration of penicillin is that intermittently higher peak blood levels are obtained which favor penetration of the penicillin into vegetations of acute or subacute bacterial endocarditis and into suppurative thrombophlebitis or other primary sites of bacteremia.

3. Additional "booster" doses of five or six times the routine intramuscular dosage which produce a blood level sufficient to clear the blood of bacteria are often desirable to assure adequate amounts of penicillin penetrating into these primary sites. 4. Subacute bacterial endocarditis and other chronic infections due to organisms of relatively high penicillin resistance are advantageously treated by massive doses administered at three-hour intervals. Minimum duration of therapy for subacute bacterial endocarditis should be five weeks. 5. Purely localized infections with highly resistant organisms, such as Actinomyces, can be best treated by a few massive doses of penicillin administered intramuscularly each day, to favor penetration during the exceptionally high peak levels, and, if possible penicillin should be administered directly into the infected area.

W. G. B. C.

SURGERY I

Supradiaphragmatic Section of the Vagus Nerve—Effect on Gastric Secretion and Motility in Patlents With Peptic Ulcer. T. F. Thornton, E. H. Storer, L. R. Dragstedt: J. Amer. Med. Assn. **130**, 764-769 (1946.)

In patients with gastric and duodenal ulcers, the continuous night secretion of gastric juice into the empty stomach is usually greater than in normal individuals. This hypersecretion is chiefly neurogenic in character and is greatly reduced by section of the vagus nerves to the stomach. The exaggerated hunger contractions, and the hypertonicity and hypermotility often displayed by the empty stomach of ulcer patients are returned to the normal state after bilateral vagotomy. Complete section of the vagus nerves to the stomach in man abolishes the secretion of gastric juice produced by a sham meal or by insulin hypoglycemia but has little effect on the response to histamine or to caffeine. The absence of a secretory response to a sham meal or to insulin hypoglycemia is good evidence that section of the vagus nerves has been complete. This contribution by Thornton and his associates is significant in that it presents the first technically complete descriptions of vagotomies in man. It indicates the possible etiological importance of the vagus nerves in peptic ulcer in man and adds significantly to the knowledge of the effect of the vagi on the stomach of man.

W. G. B. C.

SURGERY II

M. D. Custer Jun., H. R. Butt, J. M. Waugh "The So-Called 'Dumping Syndrome' After Subtotal Gastrectomy" Annals of Surgery **123** (3): 410 March 1946.

Symptoms: Distress usually starts 10-14 days after the operation or at the first postoperative meal of solid food, but it may be delayed 3-4 weeks after operation. The distress occurs during or immediately after a meal, especially breakfast, and consists of (1) nausea and weakness, (2) an unpleasant sense of warmth throughout the body, (3) cold diaphoresis of the forehead, and (4) cardiac palpitations. In severe cases, borborygmi, vomiting and diarrhoea may be present. The attack lasts 10-60 minutes and is prevented or relieved by lying down.

Aetiology: The authors believe that the cause is the rapid emptying of the stomach with resulting sudden distension of the upper bowel, which sets into action a widespread enteric reflex.

Incidence: The incidence was 5.6% (28 patients) in a series of 500 cases from 1935-38, and 12.5% in a recent series of 112, who had been especially watched for the syndrome.

Prognosis: 5-8 years after operation only 3 out of 24 patients in the first series were free of symptoms. Most of the others were entirely unchanged.

Prevention: At operation, the gastro-jejunal opening should be made small, using Hoffmeister's or Shoemaker's methods. 65 patients who had been operated by one of the above methods had either no symptoms or only transient ones which did not last longer than 3 weeks.

Treatment: (1) Lying down after meals; or (2) 3/8 grs. Ephedrine with soda-crackers after meals; or (3) 1 oz. cream or 1½ oz. olive oil before meals in order to delay the emptying time of the stomach; or (4) 6 small feedings instead of 3 large feedings; or (5) 10-12 drops of dilute HC1 in 1/3 glass of water sipped 30 minutes before the meal. This last method also delays the emptying time of the stomach substantially and has been found to give the best results.

C. L. A.

SURGERY III

C. A. Bachhuber "Deaths from Surgical Diseases of the Biliary Tract"

Am. Journ. of Surgery **71** (**3**) : 340 March 1946.

The author stresses the importance of cholecystectomy, to be performed as early as possible after detection of biliary stones. He analyses the causes of death in a series of 398 deaths. The greatest incidence in males was in the 40-49 year group, in females from 30-39 years.

Common duct stone: over 33%. More than 55% had had no surgical treatment. The immediate causes of death were simple and suppurative cholangitis and cirrhosis.

Malignancy: 20%; here missed diagnoses were very common.

Subacute and chronic cholecystitis: 13.6%; the majority here died after operation The incidence could be reduced by selecting the proper time for operation, better pre - and postoperative care and improved surgical technique.

Perforation: 12.5%; perforation is often caused by a solitary silent stone. Here 2/3 of the patients died without attempted surgery.

Acute cholecystitis: 6%; more than 2/3 had received only medical treatment and showed at autopsy secundary lung abscess, hepatitis, and peritonitis.

Empyema: 5.25%

Intestinal obstruction due to gallstones: 2.26%

Acute pancreatitis, secundary to gallstones: 7%

Stricture: 1.5%

Gangrene of the gallbladder: 1.5%

Pericholecystic abcess: 0.7%

C. L. A.

PUBLIC HEALTH I

An Outbreak of Food Poisoning in Prince Albert, Saskatchewan. H. S. Doyle: Can. J. Public Health **37**, 65-68 (1946.)

This description of an outbreak of food poisoning apparently due to a dessert contaminated by staphylococci serves to emphasize the continued importance of the enterotoxigenic staphylococci in food poisoning and to emphasize the necessity of educating food handlers and of the supervision of restaurants by sanitary inspectors. Thirty-eight cases and twenty-seven controls were investigated. Thirty-seven cases presented typical symptoms of staphylococcal food poisoning. None of the controls was ill. Epidemiological methods identified the offending food as a pudding prepared eighteen hours before serving and which was not stored in a refrigerator during that time. Bacteriological and chemical laboratory analyses were applied to the food. A strain of Staph. aureus was isolated which was a potent enterotoxin producer.

The following means are recommended to prevent such outbreaks: 1. Education of food handlers so that they will understand how successful growth of staphylococci may occur in foods. 2. Supervision of restaurants by sanitary officers to insure hygienic conditions for the preparation of foods and intelligent use of adequate refrigeration. 3. Prompt action by local authorities in securing samples of food as soon as possible after any outbreak.

W. C. B. C

RADIOLOGY I

Reinhard E. H., Moore C. Y., Bierbaum O. S., Moore S., Komen M.D. "Radio-Active Phosphorus as a Therapeutic Agent" Journ. Laborat. & Clin. Medicine vol. 31 No. 2, Feb. 1946.

After reviewing the literature and analysing the results obtained in the treatment of 155 patients with blood dyscrasies, the authors have come to the following conclusions:

(1) Radioactive phosphorus, P^{32}, emits beta rays (electrons) which have a profound radiation effect on tissues; it is selectively concentrated in tissues of a high P content, such as bones, and in tissues with rapidly dividing cells.

(2) P^{32} is probably the best therapeutic agent available at present for polycythemia vera, remissions of 6 months to several years being obtained.

(3) P^{32} is as effective in the treatment of chronic myelogenous and lymphatic leukaemia as X-radiation.

(4) P^{32} is less effective in the treatment of acute and subacute myelogenous and lymphatic leukaemia than X-radiation, and of no value in monocytic leukaemia.

(5) Severe leukopenia, thrombocytopenia, and anaemia may occur as complications of the therapy, due to the effect on the bonemarrow.

Suggestions as to administration, dosages, and methods of assaying solutions of radioactive phosphorus salts are included.

M. C. C.

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Old Way . . .

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FOR many centuries,—and apparently down to the present time, even in this country—ricketic children have been passed through a cleft ash tree to cure them of their rickets, and thenceforth a sympathetic relationship was supposed to exist between them and the tree.

Frazer* states that the ordinary mode of effecting the cure is to split a young ash sapling longitudinally for a few feet and pass the child, naked, either three times or three times three through the fissure at sunrise. In the West of England, it is said the passage must be "against the sun." As soon as the ceremony is performed, the tree is bound tightly up and the fissure plastered over with mud or clay. The belief is that just as the cleft in the tree will be healed, so the child's body will be healed, but that if the rift in the tree remains open, the deformity in the child will remain, too, and if the tree were to die, the death of the child would surely follow.

*Frazer, J. G.: The Golden Bough, vol. 1, New York, Macmillan & Co., 1923

It is ironical that the practice of attempting to cure rickets by holding the child in the cleft of an ash tree was associated with the rising of the sun, the light of which we now know is in itself one of Nature's specifics.

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